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REMARKS**Rejection of claims**

Claims 1-20 were presented for examination and were rejected.

Claims 1-20 were amended in this Amendment.

The applicant respectfully requests reconsideration in the light of the amendments and the following remarks.

Claim Rejection -- 35 USC 102 (e)

Claims 1-20 were rejected under 35 USC 103(1) as being unpatentable over Gastouniotis et al. (Patent US 5,438,329).

The applicant respectfully traverses the rejection.

The applicant respectfully submits that the amended claims claim fundamentally different invention from Gastouniotis and that Gastouniotis invention in no way makes the presently claimed invention obvious.

Claim 1 after amendment recites:

1. (Currently Amended) A method of authentication in a telemetry system, said method comprising:

transmitting, by each of a plurality of transmitters, transmissions intermittently at time intervals and at a plurality of frequencies independently of any receiver of said transmissions and independently of any other of said plurality of transmitters, and

holding, by a receiver, simultaneously for each of said plurality of transmitters, data indicative of an expected frequency and an expected time of at least one future transmission, and

authenticating transmissions based on an expected and actual transmission frequency and time.

The claim reflects the ability of the present invention to operate as a one way system, in which several transmitters transmit short intermittent transmissions, where each transmitter varies transmission frequency and the receiver simultaneously tracks all of the transmitters and uses the tracking information to authenticate received transmissions.

According to the teaching of the present invention, the receiver computes and holds the time and the frequency of the next transmission simultaneously for each transmitter. This way, when a

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transmission is due from one of the transmitters, the receiver can tune to the right frequency of the due transmission at the right time, i.e. at the time just prior to the transmission. When such transmission is completed, the receiver can determine which is the next transmitter due for transmission and tune to the right frequency at the right time, and so on. One of the advantages of such operation is that the receiver does not need perform frequency acquisition for each transmission and therefore the transmitter does not need to transmit a long preamble that would give sufficient time to the receiver to perform the acquisition. For example, if the receiver does not know when to expect transmission from a transmitter, or at what frequency, then such receiver may need to scan all available frequencies for pending transmissions and attempt to decode each signal that appear to be a pending transmission. Such scanning takes time and/or parallel resources and therefore is disadvantageous.

According to the present invention considerable transmission time may be saved resulting in corresponding battery life improvement. Importantly, the receiver can authenticate received transmissions based on the knowledge of the time and frequency of the next due transmission. E.g., if a transmission is received from a transmitter at a wrong frequency or a wrong time, the receiver may conclude that this transmission is not legitimate.

The applicant respectfully submits that Gastouniotis invention is fundamentally different and does not teach or suggest in any way what the present invention teach and what claim 1 claims. The applicant submits that the in no way it can be reasonably concluded from Gastouniotis invention the operation of the present invention at the time of Gastouniotis' invention.

In particular, Gastouniotis' receiver can not simultaneously track independently transmitting transmitters and hold time and frequency of their future transmissions. Further, obviously, Gastouniotis receiver can not use time and frequency information (which it does not possess) for authentication as described and as claimed by the present invention.

First, Gastouniotis invention mostly relates to two-way system in which the receiver can interrogate the transmitters. Thus, for any portions of Gastouniotis' invention that describe two-way operation, in no way it could be claimed that the transmitters transmit "...**independently of any receiver of said transmissions...**" as required by the first element of claim 1. For example, one skilled in the art would appreciate that there is a big difference in the operation of a receiver that can interrogate transmitters one at the time and force each transmitter to transmit at the time and frequency desired by the receiver, as opposed to a receiver of the present invention, which can simultaneously track (hold time and frequency of future transmissions) transmissions (and receive) from many independently transmitting transmitters (each of which is transmitting at plurality of frequencies), as required by the first and the

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second element of claim 1. Knowing the first kind of receiver would in no way suggest or make obvious the second. No one can reasonably claim such obviousness.

The Office seems to be confused in this matter, since the Office argues that:

....The remote station 6 [the receiver] transmits an interrogation message, which includes transmission mode, the reading cycle number, the pseudorandom code length, the clear replay channel, and the replay-window length. Hence, it would have been obvious by one of ordinary skill in the art that transmission data from an instrument link 6 would indicate an expected frequency of future transmission. [page 4 line 4-9 of the Office Detailed Action].....

(emphasis added) [comment added]

The receiver forces a transmitter to transmit at a particular frequency and at a particular time, hence, the Office concludes, this receiver must know the future transmission frequency (i.e. the clear channel for the replay). However, interrogation, of course, makes the transmitter dependent on the receiver.

In the light of the above comments, it should be crystal clear that such operation is completely different from what the present invention teaches and claim 1 claims. The Applicant respectfully submits that knowing operation of receiver as suggested, in now way makes it obvious what the present invention teaches and claim 1 claims. Such obviousness can not be reasonably claimed.

Second, Gastouniotis invention describes a mode of operation in which transmitters transmit autonomously, i.e. without interrogation (auto-transmit mode). However, Gastouniotis fails to teach or hint in any way a receiver capable of tracking simultaneously all the transmitters and anticipating the transmission frequency and time from each transmitter. In the entire disclosure there is no hint of such possibility.

Quite to the contrary. Gastouniotis explicitly describes receiver operation continuously monitoring one channel for transmissions in auto-transmit mode (one way transmission).

For example col. 21 line 56-60 and col. 21. line 68 to col. 22, line 2 read:

In the auto-transmit mode, the remote station 6 [the receiver] is initialized with the required operating parameters, step 300.

After initializing, the remote station continuously monitor the channel assigned for these transmissions for an instrument link auto-transmit message, step 302.

...After decoding the message or after computing bad read message, the remote station return to monitoring for an instrument link message, step 302.

(emphasis added) [comment added]

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This receiver does not have a clue about when to expect the transmitted message. Also, this transmitter uses only one assigned channel (the channel) for auto-transmit mode transmissions. This is very far from what the present application teaches and what claim 1 claims. The applicant respectfully submits that there is very long and very not obvious way from a receiver capable of continuously monitoring a single channel and continuously listening for messages not knowing when they will occur, to a receiver that tracks multiple transmitters each of which transmits at varying frequencies (channels).

Further, Gastouniotis explicitly states the need to perform frequency acquisition when otherwise describing receiver operation.

For example col. 18, line 63 to col.19, line 4 reads:

While no message is being received from an instrument links, the spread spectrum demodulator microprocessor continuously scans the selected channel band to determine if an instrument link is transmitting. This is a coarse scan performed in large steps of 15kHz to cover a bandwidth of 150kHz very rapidly. At each step, the microprocessor waits just long enough (two data bit time) for a complete PN sequence to be received. If no detected pulse is generated the microprocessor steps to the next frequency.

(emphasis added)

If Gastouniotis receiver were, indeed, capable of anticipating time and frequency for each transmitter, why would it need to perform expensive frequency acquisition that necessitates long preamble in each transmitted message? Obviously, this is not what the receiver is capable of doing.

Third, the Office seems to be confused about the notion of transmission time as opposed to transmission interval.

For example, the Office states: [page 4, line 10-11 of the Office Detailed Action]

The expected time of future transmission is known to the remote station 6 [the receiver] due to transmissions at fixed time intervals.

(emphasis added) [comment added]

The applicant respectfully points out that knowing that the transmission is at fixed time intervals is not the same as knowing and holding the time of the future transmission.

To illustrate this point, for example, it should be obvious that knowing that a train departs to a desired destination once a day is not the same as knowing and remembering that the train departs tomorrow at, say 13:00 hour.

The applicant respectfully submits that Gastouniotis disclosure does not provide any hint of possibility that the receiver may know time of future transmission.

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Fourth, the present invention as claimed takes advantage of the precise frequency and time tracking performed by the receiver in order to authenticate transmissions. I.e. a receiver according to the present invention may be able to correctly declare that a message that has a correct identification and whose all bits are free of transmission errors is still not valid, i.e. it is not authentic. Such authentication is in no way hinted or suggested by Gastouniotis. The applicant respectfully submits that in no way it could be reasonably claimed that such authentication could be concluded in an obvious way from Gastouniotis invention. The Applicant respectfully submits that mere use of spreading and transmitter (link) identification in the message is most certainly not sufficient to hint authentication as described and claimed.

Based on the argument given so far, it should be crystal clear that the present invention, as described and as claimed in claim 1 is fundamentally different from invention thought by Gastouniotis. The applicant respectfully submits that the Gastouniotis in no way teaches or suggests what the present application teaches and claim 1 claims.

The applicant respectfully submits that the present invention as described and claimed in claim 1 is fundamentally different and in no way is made obvious by Gastouniotis invention.

The applicant respectfully submits that, in the light of the amendment and above arguments, the Office rejection under on 35 U.S.C. 103(a) based on Gastouniotis, is traversed and claim 1 is allowable. Because claims 2 to 7 depend on claim 1, they are too allowable.

Claim 8 after amendment recites:

8. (Currently Amended) A receiver for authenticating telemetry transmissions, said receiver comprising:

logic for holding, simultaneously for each plurality of transmissions, data indicative of an expected time and an expected frequency of at least one future transmission, wherein each said plurality of transmissions is transmitted by a different one of a plurality of transmitters, wherein each of said plurality of transmitters is for transmitting transmissions intermittently at time intervals and at a plurality of frequencies independently of any equipment that is capable of receiving any of said transmissions from any of said plurality of transmitters, and

circuitry for receiving said transmissions;

wherein said receiver is for authenticating transmissions based on an expected and actual transmission frequency and time.

(emphasis added)

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The applicant respectfully submits that, in the light of the arguments given in respect to claim 1, the Office rejection based on 35 U.S.C. 102(e) is traversed and that claim 8 is allowable. Because claims 9 to 14 depend on claim 8, they are too allowable.

Claim 15 after amendment recites:

15. (Currently Amended) A frequency hopping telemetry transmitter comprising:
circuit for transmitting transmissions intermittently, at time intervals and at various frequencies, **independently of any receiver of said transmissions, and**
logic for providing a predetermined frequency-time pattern for controlling transmission frequency and time between transmissions, and
wherein said transmitter is for **varying encryption, for said transmissions, based, at least in part, on said frequency-time pattern.**
(emphasis added)

The arguments given in respect to claim 1 are applicable in respect to claim 15, in particular in respect to element 1 requiring independent operation. The Office statement on Page 9 line 1-15 is self contradicting since it implies that the transmitter transmitting independently, yet at the same time the transmitter is interrogated and ordered to set transmission mode, pseudorandom code length, clear channel for replay, etc.

For example, the Office states: [page 9, line 8-11 of the Office Detailed Action]

The receiver 44 of the instrument link [transmitter] receives an interrogation signal transmitted by a remote station 6 [the receiver]. The interrogation message includes transmission mode, the reading cycle number, the pseudorandom code length, the clear replay channel, and the replay-window length. [to be used by the instrument link for transmissions]
(emphasis added) [comment added]

Clearly, a transmitter whose transmissions depend on interrogations from a receiver is not transmitting independently of that receiver. Independent operation is clearly thought and claimed by the present invention (as required by first element of the claim).

The Office argument, which is clearly misplaced in regards to this matter, shows that the operation of the present invention, even after has been clearly disclosed, may be difficult to grasp, which only serves as a proof (if there can be such a proof) that the invention is far from obvious.

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In regard to the third element of the claim the Office states: [page 9, line 8-11 of the Office Detailed Action]

As well known in the art of the frequency hopping method, utilizing frequency hopping sequence is equivalent to encryption of data for transmission.

(emphasis added) [comment added]

The Applicant respectfully submits that utilizing frequency hopping sequence is clearly not the same as encryption.

The present invention describes and claims transmitter comprising two elements: (a) frequency hopping and (b) encrypting. The cited invention by Gastouniotis describes only one element, namely: frequency hopping. Further, the present invention describes and claims encryption that is variable, i.e. different messages (from the same transmitter) use different encryption.

The Applicant respectfully submits that no one can reasonably claim that mere knowledge of frequency hopping spreading makes the described and claimed invention obvious.

The Office argument in this matter, again, only proves that even after studying the cited reference and clear specification, the present invention may still be difficult to grasp, which is another argument that the invention is far from obvious.

The applicant respectfully submits that, in the light of the above arguments and the arguments given in respect to claim 1, the Office rejection based on 35 U.S.C. 102(c) is traversed and that claim 15 is allowable. Because claims 16 to 17 depend on claim 15, they are too allowable.

Claim 18 after amendment recites:

18. (Currently Amended) A frequency hopping telemetry transmitter comprising:
circuit for transmitting transmissions intermittently, at time intervals and at various frequencies, independently of any receiver of said transmissions, and
logic for providing a predetermined frequency-time pattern for controlling transmission frequency and time between transmissions, and
wherein said transmitter is for modification of at least a portion of known data for transmission using a modifier that is varied based, at least in part, on said frequency-time pattern.

(emphasis added)

In addition to the arguments given in respect to claim 1 and claim 15, and especially in respect to independent operation of the transmitters, the Applicant respectfully submits the following in respect to the third element of the claim:

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The Office states: [page 10, line 19 to page 11, line 2 of the Office Detailed Action]

Gastouniotis et al. does not expressly describe a modifier in the invention. However, since each instrument link 2 has unique, **pre-specified identification number** as recited in claim 1 [of Gastouniotis], the transmitter of an instrument link 2 modifies transmitted message for each of a plurality of transmissions to **include link identification number for transmission** using a modifying means as appreciated by one of ordinary skill in the art.

(emphasis added) [comment added]

The Applicant respectfully submits that the Office misses the crucial point.

It should clear that cited by the Office "**pre-specified identification**", is **constant**. The present invention alters the messages by a **variable modifier**. (The purpose and benefits of the variability is clearly described in great details in the specification of the present invention.) The Applicant respectfully submits that no one can reasonably claim that knowing the first makes the second obvious, i.e. that knowing constant makes variable obvious.

The fact that the Office misplaced the crucial argument serves only as an additional proof that the present invention is far from obvious.

The applicant respectfully submits that, in the light of the arguments given so far, the Office rejection based on 35 U.S.C. 102(e) is traversed and that claim 18 is allowable. Because claims 19 to 20 depend on claim 18, they are too allowable.

Additional Remarks

The Applicant wishes to make the Office aware of the following US patent references cited in conjunction with other applications by the Applicant pending in the Office:

US 5,309,448 - Bouloutas

US 6,466,608 - Hong

US 5,414,731 - Antunes

US 5,436,935 - Bernhard

US 5,121,408 - Cai

US 5,442,659 - Bauchot

US 5,657,343 - Schilling

US 6,567,459 - Hakkinen

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